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EXAMINER	
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ART UNIT	PAPER NUMBER
1632	10

DATE MAILED: 04/20/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.	Applicant(s)
09/206,040	Byrum et al.
Examiner	**Group Art Unit**
Scott D. Priebe, Ph.D.	1632

☐ Responsive to communication(s) filed on _____ .

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) *1-4* is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) *1-4* is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐approved ☐disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____ .

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____ .

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 7

☒ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

DETAILED ACTION

The Group and/or Art Unit designation of your application in the PTO has changed. To aid in correlating any papers for this application, all further correspondence regarding this application should be directed to Examiner Scott D. Priebe, Ph.D., Group Art Unit 1632.

Specification

The disclosure is objected to because of the following informalities: On page 17, line 19-20 and line 24, "through SEQ ID NO: 5521" is recited, and the discussion refers to multiple nucleic acid molecules. Since only one nucleic acid molecule, that of SEQ ID NO: 1, is disclosed, this part of the specification should be revised to reflect the disclosure of a single sequence.

Appropriate correction is required.

Claim Rejections - 35 USC § 101 & 112

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-4 are rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a specific asserted utility or a well established utility.

The invention is drawn to nucleic acid molecules either consisting of, consisting essentially of, or comprising the nucleotide sequence as set forth in SEQ ID NO: 1 or a fragment of the nucleotide sequence as set forth in SEQ ID NO: 1. The nucleic acid molecule set forth as SEQ ID NO: 1 is an expressed sequence tag, or EST, made as a partial cDNA from an mRNA isolated from soybean. The utilities disclosed for the EST of SEQ ID NO: 1 or fragment thereof, or a nucleic acid molecule comprising same are:

- Use as a probe for screening to identify sequence polymorphisms linked to the corresponding sequences in a genome, and to use polymorphisms identified for genetic mapping;

-Use the EST as a probe for detecting a physical map location, e.g. as a marker in *in situ* hybridization;

-Use as a probe or source of PCR primers either to isolate other nucleic acid molecules (e.g. complete cDNA, protein coding sequence, genomic fragment, promoter, start of a chromosome walk) from the same organism or different organisms, i.e. other plants, or to detect other nucleic acid molecules (e.g. mRNA, chromosomal region, chromosome). Disclosed for the latter, for example, is to detect the mRNA in different tissues or as a measure of protein expression from the mRNA (based on mRNA levels), particularly if there is a mutation (hypothetical) affecting expression;

-Use of EST or fragment thereof as an antisense inhibitor of the corresponding mRNA; and

-Use as a probe to identify or isolate proteins that might bind to the EST sequence.

Each of these utilities requires additional knowledge about the EST before the EST or fragment can be used for a specific purpose, such as the map location of its corresponding genomic sequence; the sequence of the corresponding complete mRNA sequence, protein coding sequence or genomic sequence; whether there are sequence polymorphisms linked to the corresponding genomic location and, if so, their identity; the function of the protein encoded by the corresponding mRNA; the phenotype of a mutation in the corresponding gene; the tissue distribution of the corresponding mRNA and tissue-specific expression levels; *etc.* The specification does not provide any such information specific to the disclosed EST. Consequently, the disclosed utilities are *non-specific* utilities, since any of the general disclosed utilities would apply equally to any uncharacterized nucleic acid molecule from soybean and since practice of these utilities would first require research on the disclosed EST itself, i.e. there is no apparent *immediate* benefit to the public. The only readily apparent *immediate* utility for the disclosed EST is characterization of the EST itself in terms of map location, identity of corresponding sequence polymorphisms, sequence of corresponding mRNA and polypeptide, *etc.* This sole *immediate* utility constitutes research on the claimed product itself, which is a non-statutory utility, in order to determine a specific statutory utility for the claimed invention. *Brenner v. Manson*, 148 USPQ 689, 696 (US SupCt., 1966), noted that "Congress intended that no patent be granted on a chemical compound whose sole "utility" consists of its potential role as an object of use-testing",

and stated, in context of the utility requirement, that "a patent is not a hunting license. It is not a reward for the search, but compensation for its successful conclusion.".

Further, there is no evidence of a well-established utility for the claimed nucleic acid molecules.

Claims 1-4 are also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a specific asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

In addition, claims 1, 3 and 4 contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention as directed to nucleic acid molecules comprising or consisting essentially of all of or a fragment of the EST of SEQ ID NO: 1 and additional nucleotide sequences linked to the EST or fragment thereof.

It is noted that recitation of "consisting essentially of" in claim 3 is indefinite (see rejection under 35 USC 112, 2nd para. *infra* regarding recitation of "consisting essentially of"), since it is unclear how "consisting essentially of" alters the scope of claim 3 compared to claim 1, which recites "comprising". Because the specification fails to clearly define the basic and novel characteristic of the nucleic acid molecule of claim 3, it has been assumed that the presence of the

EST of SEQ ID NO: 1 in any larger polynucleotide confers the basic and novel feature to the molecule, and that such additional nucleotides would not affect that basic and novel feature.

All of the utilities disclosed for the claimed nucleic acid molecules involve using them as hybridization probes or PCR primers. Claims 1, 3 and 4 embrace an essentially infinite genus of nucleic acid molecules comprising or consisting essentially of SEQ ID NO: 1 or an "oligonucleotide fragment ... of SEQ ID NO: 1" even when just considering nucleic acid sequences and ignoring nucleic acids comprising non-nucleotide moieties. The specification does not explicitly disclose any nucleic acid molecules that "comprise" SEQ ID NO: 1 or a fragment thereof, other than SEQ ID NO: 1 itself and fragments of it, either unlabeled or labeled with a detectable non-nucleotide moiety such as a fluorophor. No nucleic acid molecules are disclosed wherein the nucleic acid sequence is extended beyond contiguous nucleotides present in SEQ ID NO: 1.

The specification does not teach the maximum length or location (5' end, 3' end, or both ends) of nucleic acid sequence(s) that could be added to SEQ ID NO: 1 or fragment thereof, that would not interfere with its disclosed use as either a hybridization probe or PCR primer. The specification provides no guidance whatsoever other than labeling a nucleic acid molecule "consisting of" SEQ ID NO: 1 or an oligonucleotide fragment of SEQ ID NO: 1, and no working examples at all relating to the use of the claimed nucleic acid molecules.

Without knowing the composition of the target DNA, such as the size of a corresponding mRNA, the size of a specific genomic, restriction endonuclease fragment or amplified fragment,

or the extraneous sequences that may be added to the probe or primer, one would be unable to predict whether the probe or primer would function as expected under any given reaction conditions to hybridize or amplify a specific nucleic acid molecule corresponding to the intended target. Since the claims embrace adding any and all nucleic acid sequences to the core nucleic acid molecule of SEQ ID NO: 1, one cannot predict *a priori* whether or not the additional nucleic acid sequence added would hybridize to a target nucleic acid molecule other than the intended target nucleic acid molecule. When such a situation occurs, and more than one nucleic acid molecule is amplified or detected in hybridization, the skilled artisan would have no information that would allow the desired target nucleic acid molecule to be distinguished from a nucleic acid molecule that was targeted by the added nucleic acid sequences. This simple situation would be further complicated if SEQ ID NO: 1 or the intended target nucleic acid was one of a number of different repeated nucleotide sequences in a sample or if the added nucleotide sequence comprised one of a number of different repeated nucleic acid sequences in a sample, each with varying degrees of binding specificity under hybridization or amplification reaction conditions between primer or probe and target nucleic acid molecules. One cannot predict *a priori* whether either the intended target nucleic acid or nucleic acid sequences added to a probe or primer are one of a number of repeated nucleic acid sequences; *a posteriori* trial and error experimentation would be required.

Consequently, making the myriad of nucleic acid molecules embraced by the claims and testing the suitability of each for use as a probe or primer for the disclosed utilities in the absence

of guidance or examples would require excessive trial and error experimentation due to the unpredictability involved, and would therefore require undue experimentation.

Claims 1, 3 and 4 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1, 3 and 4 are drawn to nucleic acid molecules "comprising" or "consisting essentially of" (which is indefinite in this context, see rejection under 35 USC 112, 2nd para. *infra*) the EST of SEQ ID NO: 1 or fragment thereof; and therefore to an essentially infinite genus of nucleic acid molecules comprising SEQ ID NO: 1 or fragment thereof even solely considering nucleic acid sequences and ignoring nucleic acid molecules comprising non-nucleotide moieties such as detectable labels. The specification does not explicitly disclose any nucleic acid molecules that "comprise" or "consist essentially of" SEQ ID NO: 1 or fragment thereof, other than that of SEQ ID NO: 1 itself (either unlabeled or labeled with a detectable non-nucleotide moiety such as a fluorophor). No nucleic acid molecules are disclosed wherein the nucleic acid sequence is extended beyond SEQ ID NO: 1, other than solely by implication a larger EST or mRNA comprising SEQ ID NO: 1. However, the specification does not disclose the structure of any such larger nucleic acid molecule or EST or mRNA. The disclosure of the single nucleic acid molecule

set forth as SEQ ID NO: 1 does not adequately describe the infinity of any and all possible nucleic acid molecules embraced by claims 1, 3 and 4.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "substantially purified" recited in each of claims 1-4 is a relative term which renders the claim indefinite. The term "substantially" is not defined by the claim, the specification does not provide a clear standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The definition of "substantially purified" at page 15, para. 4, of the specification states that "one or more molecules that is or may be present in a naturally occurring preparation containing that molecule will have been removed or will be present at a lower concentration than that at which it would normally be found". This definition is unclear, especially with respect to "natural preparation" and the "lower concentration". It is unclear what "natural preparation" means; if it is natural, how can it be a "preparation" which suggests the hand of man. It is also unclear whether "lower concentration refers to absolute concentration or concentration relative to "that molecule" i.e. the recited

nucleic acid molecule. For example, dilution of a cell preparation by a solution of lysing agent in making a cell lysate would yield a "lower concentration" of the "one or more molecules" (contaminant) and "that molecule" (recited nucleic acid molecule), without lowering the concentration of the "one or more molecules" relative to "that molecule". Also, dehydration of cells would remove "one or more molecules" of water or reduce the water concentration, but all other molecules would still be present in the same relative concentrations.

Claim 3 recites "consisting essentially of" in reference to a nucleic acid molecule. The metes and bounds of this claim are unclear because the specification does not clearly and explicitly define the basic and novel characteristic of the core nucleic acid sequence set forth as SEQ ID NO: 1. Additional, nucleic acid sequences can be readily added to a core nucleic acid molecule, in this case the nucleic acid molecule of SEQ ID NO: 1. It cannot be determined from the specification whether or not any given nucleic acid molecule added to the core affects the basic and novel characteristic of the claimed nucleic acid molecule. Since the specification does not clearly and explicitly define the basic and novel characteristic of the claimed nucleic acid molecule, it is unclear whether or not, for example, a larger EST or mRNA comprising the disclosed EST sequence; a vector comprising the disclosed EST; or a nucleic acid that comprises oligonucleotide adaptors or linkers (to facilitate cloning or PCR amplification) would be embraced by the claim or not. It is unclear how the transitional phrase "consisting essentially of" used in this context differs from the transitional term "comprising" recited in claim , and consequently it is unclear how, or

even if, the scope of claim 3 is different from that of claim 1. The phrase "consisting essentially of" is therefore vague and indefinite in this context.

Recitation of "about 15 to about 250 nucleotides" in claim 4 is indefinite. The term "about" is a relative term which renders the claim indefinite. The term "about" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. For example, it is unclear whether 5, 10, 12 or 14 nucleotides are "about 15" nucleotides, or whether 255, 275 or 300 nucleotides are "about 250" nucleotides.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Reams.

Reams discloses a method of reducing the moisture content of soy bean seeds (see col. 11, claims 1 and 7), which would produce desiccated soy bean seeds. The EST of claim 1 was made from RNA isolated from soy bean seed (specification, page 67, Example 1), and "substantially purified" has been defined as the removal or reduction in concentration of one or more molecules present in a "natural preparation" (specification, page 15, para. 4). Consequently, the partially

desiccated soy bean seeds of Reams meet the limitation of the claims 1, 3 and 4 as being a substantially purified nucleic acid molecules wherein the concentration of water in the seeds is lower than in a natural preparation, i.e. fresh seeds. In the absence of evidence to the contrary, it is assumed that at least one nucleic acid molecule, e.g. mRNA or genomic DNA, comprising or consisting essentially of SEQ ID NO: 1 or comprising a 15-250 nucleotide fragment of the EST of SEQ ID NO: 1 would be present in the desiccated soy bean seeds of Reams given that the EST of SEQ ID NO: 1 was prepared using RNA from soy bean seed.

Claims 1, 3 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Choi et al. (Plant Physiol. 101 (2): 699-700, 1993).

Choi et al. discloses a preparation of poly (A+) RNA from immature soy bean seeds and a cDNA library made from the RNA (Table I, page 699). The EST of claim 1 was made from mRNA isolated from immature soy bean seed (specification, page 67, Example 1), and "substantially purified" has been defined as the removal or reduction in concentration of one or more molecules present in a "natural preparation"(specification, page 15, para. 4). Either the poly (A+) RNA or cDNA library of Choi et al. meet the limitation of claims 1, 3 and 4 of "substantially purified" nucleic acid molecules since most other cellular constituents would have been removed from the poly (A+) RNA, and would not be present in the cDNA library. In the absence of evidence to the contrary, it is it is assumed that at least one nucleic acid molecule, e.g. mRNA or cDNA, comprising or consisting essentially of SEQ ID NO: 1 or comprising a 15-250 nucleotide

fragment of the EST of SEQ ID NO: 1 would be present in the poly (A+) RNA or cDNA library of Choi et al. given that the EST of SEQ ID NO: 1 was also prepared using RNA from immature soy bean seed.

Claim 4 is rejected under 35 U.S.C. 102(b) as being anticipated by Shen et al. (GenBank Acc. No. T18698, Oct. 1996).

Shen et al. discloses an isolated or "substantially purified" nucleic acid molecule comprising an oligonucleotide fragment of between 15 and 250 nucleotides of the sequence of SEQ ID NO: 1. Specifically, nucleotides 25-54 of the nucleic acid molecule of Shen et al. are identical to a 30 nucleotide fragment of SEQ ID NO: 1 from nucleotide 29 to nucleotide 58.

Certain papers related to this application may be submitted to Art Unit 1632 by facsimile transmission. The FAX number is (703) 308-4242 or 305-3014. The faxing of such papers must conform with the notices published in the Official Gazette, 1156 OG 61 (November 16, 1993) and 1157 OG 94 (December 28, 1993) (see 37 CFR 1.6(d)). NOTE: If applicant *does* submit a paper by FAX, the original copy should be retained by applicant or applicant's representative. NO DUPLICATE COPIES SHOULD BE SUBMITTED, so as to avoid the processing of duplicate papers in the Office.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott D. Priebe whose telephone number is (703) 308-7310. The examiner can normally be reached on Monday through Friday from 9 AM to 5 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Stanton, Ph.D., can be reached on (703) 308-2801.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0196.

Scott D. Priebe

Scott D. Priebe, Ph.D.
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